APPENDIX

UNITED STATES COURT OF APPEALS FOR THE NINTH CIRCUIT

KWIKSET LOCKS, INC., ADOLF SCHOEPE and KARL REINHARD, *Appellants,* vs. CARL A. HILLGREN, *Appellee.*	)	No. 13,060 Mar. 16 1953
CARL A. HILLGREN, *Appellant,* vs. KWIKSET LOCKS, INC., ADOLF SCHOEPE and KARL REINHARD, *Appellees.*	)	

Appeals from the United States District Court, Southern District of California, Central Division

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Before: STEPHENS, HEALY, and POPE, Circuit Judges

STEPHENS, Circuit Judge

Carl A. Hillgren is the holder of United States Letters Patent No. 2,403,597, issued July 9, 1946, for an invention of a "Door Lock". Kwikset Locks, Inc., is

the owner of a United States Letters Patent No. 2,489,160, issued to Adolf Schoepe and Albert S. Lord, jointly, on October 20, 1947, on a "Doorknob and Method of Making Same", and assigned to Kwikset on November 22, 1949. Hillgren brought suit in the United States District Court for the Southern District of California, charging Kwikset, Adolf Schoepe, and Karl Reinhardt (hereinafter referred to collectively as "Kwikset") with infringement of its "Door Lock" patent and seeking an injunction and damages. Kwikset answered, denying infringement and alleging that Hillgren's patent is void as anticipated. Kwikset in addition sought affirmative relief by way of counter-claim for injunction and damages based upon the allegation that Hillgren was infringing Kwikset's patent on a "Doorknob and Method of Making Same". Hillgren denied the charge of infringement and attacked the validity of Kwikset's doorknob patent.

The complaint and counter-claim were tried together. After hearing all the evidence, the court found that Hillgren's "Door Lock" patent No. 2,403,597 was valid and had been infringed by Kwikset and that Kwikset's "Doorknob" patent No. 2,489,160 was valid and had been infringed by Hillgren.

The court awarded both plaintiff (Hillgren) and counter-claimant (Kwikset) their prayers for injunctions and ordered that an accounting for damages be had against the defendant (Kwikset) and counter-defendant (Hillgren), respectively. Both Kwikset and

Hillgren appeal from adverse judgments. We shall treat the appeal from the complaint and the appeal from the counter-complaint separately.

I. THE HILLGREN "DOOR LOCK"

The Hillgren "Door Lock" is described most simply as a reverse rocker type lock with a deadlatching mechanism. The Kwikset lock may be identically defined. As the court stated in its findings, the reverse rocker type lock is found in the prior art.[1] The reverse rocker type lock, employed by both Hillgren and Kwikset operates as follows: When a doorknob is unlocked the spindle may be turned in either direction, forcing the main action of the bolt forward. As the main action advances, it engages a pivoted rocker, forcing the top end of the rocker forward which consequently brings the bottom end of the rocker backward. Since the bottom of the rocker is engaged in the main lock bolt, this movement retracts the main bolt from its secured position in the door sash.

Both the reverse rocker type lock and the direct action bolt lock, as they appeared in the prior art, had one serious defect: Although the main action could not be put into play to bring back the main bolt when the knob was locked in position, if a knife or thin blade were inserted between the door sash and the main

[1]Findings of Fact, 9(e): "A deadlocking mechanism is incorporated in the midst of a reverse rocker type lock mechanism and all of the advantages, functions and results of both the prior art reverse rocker type locks and the prior art deadlatched locks is achieved for the first time in one combination lock."

lock bolt, the bolt could be forced back and the door opened.

However, the prior art has also disclosed a mechanism for deadlatching the main bolt and thereby forestalling any attempt to force back the bolt other than by the turning of an unlocked door and spindle. The deadlatching mechanism operates in the following manner: In addition to the main bolt, the lock is constructed with an auxiliary bolt, independently operated and so located that when the door is in a closed position the main bolt is extended into the recess of the door sash while the auxiliary bolt is depressed back toward the main housing of the lock. Within the lock housing is a dogging arm which is held clear of the main bolt by the auxiliary bolt when the auxiliary bolt is in the extended position. However, when the auxiliary bolt is depressed, the dogging arm is freed and is so constructed that when unrestrained it moves into a position to block any effort to force the main bolt back into the housing. However, when the main action of the lock is put into operation by means of the door knob and spindle, the dogging arm is raised from its blocking position by a beveled lug which is part of or operates solely in conjunction with the main action.

Hillgren concedes that the trial court specifically found that a deadlatching mechanism was present in the prior art. However, the conclusion that the Hillgren patent is valid is based primarily upon Hillgren's claims, embodied in finding 9a, that the Hillgren patent discloses "[t]he world's first deadlatched reverse

rocker type lock." In other words, Hillgren is claiming, and the district court sustained, a patent on a combination.[2]

Congress, in its exercise of a constitutional delegation of authority,[3] has provided for the patenting of inventions and discoveries of new and useful arts or processes, machines, manufactures or compositions of matters, or new and useful improvements thereof. Title 35, U.S.C.A. §31 (cf. revision, 1952, Title 35, U.S.C.A. §101). Thus, in order for the Hillgren lock mechanism to be patentable, it must be established as a combination which is an "invention".

What constitutes "invention" defies precise definition. The revisers of Title 35, U.S.C.A., apparently gave up even an attempt to establish an all-embracing statutory definition, for, among their definitions of terms used in the new Patent Code, appears the following: "The term 'invention' means invention or discovery." 35 U.S.C.A. §100(a). The courts have attempted at least to fix some guideposts to indicate wherein the realm of invention lies. These judicial attempts at definition are either very sweeping and consequently general, or so narrow as to be applicable only to a specific device or process. And at times the courts are content to establish what is definitely not inventive. To require "exceptional imaginative tal-

[2]Findings of Fact 6: "Claims 1 and 2 of said Letters Patent No. 2 403,597 each cover a new *combination* and each constitute *invention* over the prior art. [Emphasis ours.]

[3]Art. I, §8, Constitution, U.S.C.A.

ent"[4] or "creative genius"[5] or to declare that there must be an "impalpable something"[6] which "spring[s] from that intuitive faculty of the mind"[7] is of no concrete aid to a judge who is a layman in the fields of science and engineering.

In the circumstances where a patent is sought on a combination of devices or processes known to the prior art, the concept of invention remains elusive. It has been said that, in order for the combination to be considered a patentable invention it must "perform some new or different function—one that has unusual or surprising consequences." *Photochart v. Photo Patrol,* 9 Cir., 1951, 189 F. 2d 625, 627; *Grinnell Washing Machine Co. v. Johnson Co.,* 1918, 247 U.S. 426; *Great A. & P. Tea Co. v. Supermarket Equipment Corp.,* 1940, 340 U. S. 147. There is no invention in a "mere *aggregation* of a number of old parts or elements",[8] nor in the *accumlation* of old devices which do not in some way exceed "the sum of its parts".[9] [Emphasis ours.] Moreover, a truly inventive combination must create what had not before existed or bring to light what lay hidden from vision[10] in a way which can be distinguished from "simple mechanical skill".[11] A

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[4]*Gelardin v. Revlon Products Corp.*, 1948, 2 Cir., 164 F. 2d 910, 911.

[5]*Magnaflux Corp. v. Coe*, DCCA, 1943, 139 F. 2d 531; *Cuno Engineering Corp. v. Automatic Devices Corp.*, 1941, 314 U. S. 84, 91. But cf. 35 U.S.C.A. §103. 1952 Rev.

[6]*McClain v. Ortmayer*, 1891, 141 U. S. 419, 427.

[7]*Hollister v. Benedict Mfg. Co.*, 1885, 113 U. S. 59, 72.

[8]*Lincoln Engineering Co. v. Stewart-Warner Corp.*, 1938, 303 U. S. 545, 549; *Pickering v. McCullough*, 1881, 104, U. S. 310, 318.

[9]*Great A. & P. Tea Co. v. Supermarket Equipment Corp.*, 1950, 340 U. S. 147, 152; *Himes v. Chadwick*, 9 Cir., 1952, 199 F. 2d 100, 106.

[10]*Hollister v. Benedict Mfg. Co.*, 1885, 113 U. S. 59, 72.

[11]*McClain v. Ortmayer*, 1891, 141, U. S. 419, 427.

mere advance in efficiency and utility is not enough to convert a non-inventive aggregation into a patentable combination.

The Supreme Court has recently considered the problem of patentable combinations and has established certain criteria and standards which the federal courts must apply in determining whether a combination patent is valid. The Supreme Court directs us to "scrutinize combination patent claims with a care proportioned to the difficulty and improbability of finding invention in an assembly of old elements. The function of a patent is to add to the sum of useful knowledge. Patents cannot be sustained when, on the contrary, their effect is to subtract from former resources freely available to skilled artisans. A patent for a combination which only unites old elements with no change in their respective functions, * * * obviously withdraws what already is known into the field of its monopoly and diminishes the resources available to skillful men." *Great A. & P. Tea Co. v. Supermarket Equipment Corp.*, supra. The Supreme Court further requires that in order for a combination patent to be upheld, there must be a specific finding that the old elements which made up this device perform an additional and different function in combination, than they perform out of it. No such finding was made in the case at bar.[12] Nor do we believe that the district court

[12]The court based its conclusion of invention on the findings that the Hillgren lock used fewer parts and required fewer machining operations to accomplish "prior art functions and results", and on the finding that this was the first time the prior art reverse rocker type lock had been combined with the prior art deadlatching mechanism. Findings 9a to e.

applied the strict standard or close scrutiny to this combination patent required by the Supreme Court.

It is agreed that the deadlatch mechanism is to be found in the prior art. Hillgren's claim is based on the fact that he is the first person to apply the deadlatch mechanism to a reverse rocker type lock. Beyond the application of the deadlatch principle to the reverse rocker type lock, no novelty is shown by the exhibits or record, nor in the finding of the court.[13] Conceding a high degree of mechanical skill to effect the combination, we are firmly convinced that the district court was clearly wrong in concluding that such a combination is patentable for it accomplishes no more than the sum of its parts.

In both the prior art, as exemplified by the Schlage lock, and in the patented Hillgren lock, as well as the allegedly infringing Kwikset lock, the deadlatching mechanism is engaged behind the main bolt by the action of an auxiliary bolt and is disengaged by a lug attached to or operated in conjunction with the main action. The principle upon which the deadlatching mechanism operates is no different if used in conjunction with a direct action or reverse rocker type lock.

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[13]Hillgren's reduction of the number of parts necessary to accomplish the art of deadlatching, and his reduction in the number of machining operations to produce a reverse rocker type lock in no way establish patentable novelty in the combination of the deadlatching mechanism with a reverse rocker type lock since, as is shown by the Kwikset lock, such reductions are not necessary in order to effect the combination nor necessarily advantageous in any manner. Moreover, Kwikset admittedly uses more parts than Hillgren to deadlatch the bolt; and there is neither a claim nor a showing that Kwikset has copied or relied on Hillgren's fewer machining operations to manufacture the Kwikset reverse rocker type lock. Thus Kwikset does not infringe Hillgren's deadlatching or reverse rocker manufacturing processes.

Such difference as there is to be recognized must be restricted to the realm of admittedly skillful mechanical know-how.

The case of *Sargent v. Hall Safe and Lock Co.*, 1885, 114 U. S. 63, dealt with an attempt to patent a time guard on a combination-lock. The device there sought to be patented rendered the lock incapable of being unlocked until the arrival of a predetermined hour. It was admitted that a time guard had previously been employed in connection with a key lock. The Supreme Court, in holding the patent invalid, quoted with approval the board of patent examiners: "Nor, so far as we see, has any invention been exercised. The time-movement [deadlatching mechanism] was originally invented to prevent locks from being prematurely unlocked, and, when once the combination had been invented, it is obvious that it was as applicable to one form of locks as to another; and to grant a patent for the union of the time-movement [deadlatching mechanism] with every old form of lock, or with every new form which might appear, would manifestly place unjust restrictions on the original invention and defeat the very purpose of the law." *Sargent v. Hall Safe and Lock Co.*, supra, at p. 79; *Victor Cooler Door Co. v. Jamison Cold Storage Door Co.*, 1930, 4 Cir., 44 F. 2d 288, 295.

We conclude that the district court committed reversible error in sustaining Hillgren's "Door Lock" patent since in so doing it failed to apply the strict standard for testing combination patents which was

laid down by the Supreme Court in *Great A. & P. Tea Co. v. Supermarket Equipment Corp.*, supra.

Appellee, Hillgren, has relied heavily upon the presumption of validity which attaches to a patent granted by the patent office and sustained by the district court. And he further urges that a finding of validity is a finding of fact which cannot be reversed unless clearly erroneous. The patent in the *A. & P.* case, supra, had been sustained by the patent office and the district court, and the court of appeals had considered itself bound by the finding of fact of validity. Yet the Supreme Court reversed for failure to apply the proper test to a combination. We recognize and have given due weight to the expertness of the patent office and the thorough consideration of this problem by the district court. However, we must also recognize "that it is the 'standard of invention' that controls. That is present in every case where the validity of a patent is in issue. It is that question which the Court must decide. No 'finding of fact' can be a substitute for it in any case." Justice Douglas concurring in *Great A. & P. Tea Co. v. Supermarket Equipment Corp.*, supra, at p. 156; *Himes v. Chadwick*, 9 Cir., 1952, 199 F. 2d 100, 102.

II. THE KWIKSET "DOOR KNOB"

Kwikset's patent No. 2,489,160 is on a "method of making door knobs"; i.e., it is a process patent. And as such, its scope must be strictly limited to the particular manner in which its several parts are fitted

together as a door knob. A "patentee's broadest claim can be no broader than his actual invention." *Kemart Corp. v. Printing Arts Research Lab., Inc.*, 9 Cir., Jan. 26, 1953, ... F. 2d .....; *Schnitzer v. California Corrugated Culvert Co.*, 9 Cir., 1944, 140 F. 2d 275, 276.

The Kwikset knob has three major parts: the shell, an insert applicable to a door knob spindle, and a cap closing the outer end of the shell. Since knobs consisting of these three elements are not new to the art,[14] if the validity of the Kwikset patent is to be sustained, it must be by the particular construction of the several parts and the manner in which they are fitted together. Cf. *Cambridge Trust Co. v. Coe*, D.C.Cir., 1936, 87 F. 2d 543.

The district court in its findings describes the method by which the Kwikset cap it *fitted tightly* between the "annular portion" of the shell and the "annular portion" of the insert. The court's use of the term "annular portion" is apparently derived from the use of the term by Kwikset in its claims 3 to 6. In its claim 1, Kwikset uses the term "curl" and in its claim 2, the term "inwardly directed flange". We conclude that the three terms are synonymous.

An examination of the Kwikset knob shell discloses that the edge of the knob shell, which is the part grasped by the hand in using it, is curved or "curled" inwardly. The metal member, called "insert", attached to the lock-turning spindle, is curved at the end so as

[14]See, e.g., patents Nos. 242,922; 337,093; 1,687,531; 2,430,727, at pages 888, 889, 891, and 893 of the Record, respectively.

to fit the shell curve. A disk with a straight rim is pressed between the inwardly curved shell and the fitting member, completing the knob. It is seen that the rim of the cap is pressed between the curl of the shell and the member, and cannot be removed without disassembling the knob.

Under the provisions of the patent laws, a new and useful process is patentable. 35 U.S.C.A. §31; 35 U.S.C.A., 1952 Rev., §101. The district court has found that Kwikset's fitting or method of making a door knob is new and involves invention over the prior art, and we think the evidence supports the finding.

The district court found that the knobs manufactured and sold by Hillgren infringed Kwikset's door knob patent in that they were mere "colorable variations" and "mechanical equivalents" of Kwikset's invention. The court's finding of infringement is based upon findings 25 and 26, which we quote:

> "25.
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> "The structure of a door knob comprising an insert applicable to a door lock spindle with a shell around the insert, the shell and insert presenting annular portions in close proximity to each other, and a cap closing the outer end of the shell having a flange disposed between the annular portions spread by the annular portion on the insert beneath the annular portion on the shell and *having a tight fit with the annular portions,* was new in the art." [Emphasis ours].

"26.

"The method of making the door knob and the structure resulting therefrom wherein an insert applicable to a door lock spindle and a surrounding shell are assembled together with both parts presenting annular portions near their outer ends and driving a flanged cap onto the insert so that its flange is spread by the insert beneath the annular portion on the cap and is held against springback by the continued engagement between flange and the insert, was new over the art and involved invention over what was known in the art."

While it is true that the district court's finding of infringement is a finding of fact and may not be set aside unless clearly erroneous, Rule 52(a), Federal Rules of Civil Procedure, 28 U.S.C.A.; *Graver Mfg. Co. v. Linde Co.*, 1950, 339 U.S. 605; *Faulkner v. Gibbs*, 9 Cir., 1948, 170 F. 2d 34, affirmed (Nov. 7) 1949, 338 U.S. 267, rehearing denied (Dec. 5) 1949, 338 U.S. 896, "it is [also] well settled that where, as here, there is no dispute as to the evidentiary facts, and the record and exhibits enable us to clearly comprehend the nature both of the process patented and the alleged infringing process, the question of infringement resolves itself into one of law, depending upon a comparison between the two processes and the correct application thereto of the rule of equivalency. The testimony in this case was largely expository and descriptive of the elements and operation of the two processes and was not disputed." *Kemart Corp. v. Printing Arts Research Lab., Inc.*, supra; *United States v. Esnault-Pelterie*, 1938, 303 U.S. 26, 30.

The Hillgren process or method of assembly is different from that of the Kwikset. In the Hillgren knob the edge of the shell does not curl, but extends directly against the cap flange. Thus the "curl" or "annular portion," which is a distinguishing characteristic of the Kwikset knob, is absent. Furthermore, the Hillgren cap flange is bent so that it forms a groove extending around the lower circumference of the cap. In assembling the Hillgren knob, the insert is placed within the shell; then the edge of the shell is forced laterally into the cap groove. The cap is thus held by a form of tongue-in-groove. Pressure against the cap flange between the shell and the insert is not an element of the Hillgren knob, as it is of the Kwikset knob. Thus the Hillgren cap is not held by a "tight-fit with the annual portions"[15] nor is the "springback"[16] of the "curl" essential to keeping the cap in place. And, finally, there is a pertinent difference in that the Kwikset cap is inserted by being forced between the shell and the insert, while the Hillgren cap is inserted by laterally forcing the shell toward the cap groove. The Kwikset and the Hillgren knobs are not equivalents since there is no substantial identity in the method of assembly nor in the method by which the cap is held in place. See *Kemart Corp. v. Printing Arts Research Lab., Inc., supra.*

Reversed, as to each judgment.

(Endorsed:) Opinion. Filed Mar. 16, 1953. Paul P. O'Brien, Clerk.

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[15]Finding 25.
[16]Finding 26.

UNITED STATES PATENT OFFICE

2,517,803

DOORKNOB

Nels H. Seaholm, Sierra Madre, Calif., assignor to Carl A. Hillgren, Huntington Park, Calif.

Application May 24, 1948, Serial No. 28,825

7 Claims. (Cl. 292—347)

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This invention relates to a door knob.

One of the principal objects of this invention is to provide a door knob consisting of a thin outer shell member, a reinforcing core member anchored therein, and a cap secured to the outer end of the shell member over the outer end of the core member, in such a manner that the cap is tightly secured or crimped at its periphery to the shell comprising the main knob member.

Another important object of this invention is to provide a novel and rigid seam for securing a concealing or cap member to the inner and outer sides of an opening in a knob, or other member, an important object also consisting in the securing of said members together by reason of the construction of a core member which is also secured to the knob member and the cap.

An important object also of this invention is the provision of a novel and simple means of securing the core member of a knob of this class within the shell comprising or forming the outer element of the door knob.

A further important object of this invention is the provision of a novel, simple, and economical method of fabricating a door knob.

With these and other objects in view, as will appear hereinafter, I have devised a door knob having certain novel features of construction, combination, and arrangement of parts and portions, as will be hereinafter described in detail, and particularly set forth in the appended claims, reference being had to the accompanying drawings and to the characters of reference thereon, which form a part of this application, in which:

Fig. 1 is a longitudinal view of a door knob, partly in section and partly in elevation, embodying my invention in a preferred form;

Fig. 2 is an outer end view thereof, with portions broken away and in section to facilitate the illustration;

Fig. 3 is a sectional view of the inner end portion thereof, with this section taken through 3—3 of Fig. 1; and,

Fig. 4 is a partially exploded side view thereof, with the portions partly in section, and showing by dotted lines the knob member before securing the core member in place, and also showing the cap before being secured in place over the end of the knob member.

The door knob shown in the drawings consists essentially of only three members, namely, a main or outer door knob member 1, a core or core member 2, and a cap 3.

The knob member 1 is preferably pressed or spun from sheet metal with an oblate spheroidal

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portion 1^a forming the outer end portion of the knob, and with a substantially conically-shaped ferrule 1^b at the inner portion. In its substantially completely formed shape, the outer end portion of the knob member, that is, the outer side of the oblate spheroid-shaped outer end, has a relatively large central opening 1^c which is coaxial with the knob. The inner side of this oblate spheroidal portion has an annular shoulder 1^d which is substantially normal to the axis of the knob, and which is of a diameter substantially equal to the diameter of the opening 1^c, as shown in Figs. 1 and 4, and as will be more specifically referred to hereinafter.

The core member 2 has a substantially cylindrical portion 2^a at its outer end and a reduced conical portion 2^b inwardly thereof. The cylindrical or annular portion 2^a is enlarged and is designed to fit within the enlarged oblate spheroidal portion 1^a of the knob member while the portion 2^b fits against the inner wall of the ferrule portion 1^b of the knob member.

In the end of the cylindrical or annular portion 2^a of the core member is an annular groove 2^c which is of semi-circular cross-section. The inner edge 2^d of the groove is positioned radially inwardly of the edge of the opening 1^c, while the radially outer edge 2^e of the groove 2^c is positioned radially outwardly of such edge of the opening, that is, behind or at the inner side of the wall surrounding the opening 1^c.

The cap 3, before being secured to or forming a part of the knob, is cup shaped, that is, it has an inwardly extending annular flange 3^a which is positioned at a slight distance inwardly from the periphery of the cap, as shown in Fig. 4. When secured in position to the knob member 1 and the core 2, the flange is curled inwardly and assumes a shape shown in Fig. 1. In this position, the peripheral portion of the cap embraces both the inner and outer sides of the portion of the knob member surrounding the opening 1^c.

The knob member 1 is formed with a cup at its outer end before the core member 2 is inserted. The surrounding flange or side wall of the cup is cylindrical, as shown by A in Fig. 4. After the core 2 is inserted, the side wall or flange is folded inwardly with the inner edge substantially over the middle portion of the groove 2^c.

The cap 3 is positioned over the end of the knob with a flange 3^a inserted into the opening 1^c of the knob member 1 and into the groove 2^c. The cap is then forced into position by placing the inner side of the oblate spheroidal portion of the knob member, that is, the annular shoulder 1^d,

over an annular anvil, and then applying force against the outer side of the cap 3 at the portion indicated by the arrows B.

The core member 2 has, at its inner end, an axial portion 2^f having a keyed or polygonal opening 2^g, whereby the knob is secured to a lock spindle. This portion 2^f is shown as extending inwardly beyond the inner end of the ferrule, and is provided with longitudinal grooves 2^h at its opposite sides. The inner end of the ferrule has ears i^a which are bent inwardly into the grooves 2^h, thereby more rigidly securing the knob member 1 to the core member.

I wish it to be understood that I do not desire to be limited to the exact details of construction shown and described, for obvious modifications will occur to a person skilled in the art.

I claim:

1. In a door knob, a knob member having an oblate spheroid-shaped outer end portion with an axial opening in the outer end, an annular core anchored within said outer end portion of the knob member, the outer end of the core having an annular groove of substantially semi-circular cross-section, the radially inner edge of the groove being located radially inwardly from the edge of the opening and the radially outer edge of the groove being positioned behind the end portion of the knob member and an end cap having a peripheral flange extending into the opening and located within the groove, the peripheral outer portion of the cap and the inner portion of the flange embracing, respectively, the outer and inner sides of the edge portion of the knob member forming the opening.

2. In a door knob, a sheet metal knob member formed as a surface of revolution and having an oblate spheroid-shaped outer end portion with an axial opening in the outer end, an annular core anchored within said outer end portion of the knob member, a portion of the outer end of the core extending radially inwardly of the edge of the opening, the outer end of the core having an annular groove of substantially semi-circular cross-section, the radially inner edge of the groove being located radially inwardly from the edge of the opening and the radially outer edge of the groove being positioned behind the end portion of the knob member, and an end cap having a peripheral flange extending into the opening and located within the groove, the peripheral outer portion of the cap and the inner portion of the flange embracing, respectively, the outer and inner sides of the edge portion of the knob member forming the opening.

3. In a door knob, a knob member having an oblate spheroid-shaped outer end portion with an axial opening in the outer end, the inner portion of the knob member having a ferrule converging towards its inner end, an annular core member anchored within said outer end portion of the knob member, the outer end of the core member being enlarged and fitting partially within said spheroid-shaped end and having a reduced inner end fitting within said ferrule, the outer end of the core member having an annular groove of substantially semi-circular cross-section, the radially inner edge of the groove being located radially inwardly from the edge of the opening and the radially outer edge of the groove being positioned behind the end portion of the knob member, and an end cap having a peripheral flange extending into the opening and located within the groove, the peripheral outer portion of the cap and the inner portion of the flange embracing, respectively, the outer and inner sides of the edge portion of the knob member forming the opening.

4. In a door knob, a knob member having an oblate spheroid-shaped outer end portion with an axial opening in the outer end, an annular core anchored within said outer end portion of the knob member, the outer end of the core having an annular groove of substantially semi-circular cross-section, the radially inner edge of the groove being located radially inwardly from the edge of the opening and the radially outer edge of the groove being positioned behind the end portion of the knob member, the knob member having an annular shoulder at the inner side of the oblate spheroid-shaped portion and of a diameter substantially equal to the diameter of the opening, and an end cap having a peripheral flange extending into the opening and located within the groove, the peripheral outer portion of the cap and the inner portion of the flange embracing, respectively, the outer and inner sides of the edge portion of the knob member forming the opening.

5. In a door knob, a knob member having an oblate spheroid-shaped outer end portion with an axial opening in the outer end, the inner portion of the knob member having a ferrule converging towards its inner end, an annular core member anchored within said outer end portion of the knob member, the outer end of the core member being enlarged and fitting partially within said spheroid-shaped end and having a reduced inner end fitting within said ferrule, the outer end of the core member having an annular groove of substantially semi-circular cross-section, the radially inner edge of the groove being located radially inwardly from the edge of the opening and the radially outer edge of the groove being positioned behind the end portion of the knob member, and an end cap having a peripheral flange extending into the opening and located within the groove, the peripheral outer portion of the cap and the inner portion of the flange embracing, respectively, the outer and inner sides of the edge portion of the knob member forming the opening, the inner end of the core member extending inwardly of the ferrule and provided with longitudinal grooves at its diametrically opposite sides, the inner end of the ferrule having ears extending into said grooves.

6. In a door knob, a knob member having an enlarged outer end portion and a ferrule at its inner portion, the side walls of the ferrule converging towards the inner end of the knob member, the outer end of the knob member having an axial opening, a core member anchored within said knob member, and an end cap secured at its peripheral portion to the inner and outer sides of the edge portion of the opening, the inner end of the core member extending inwardly of the ferrule and provided with longitudinal grooves at its diametrically opposite sides, the inner end of the ferrule having ears extending into said grooves.

7. The herein described method of constructing door knobs consisting in making a knob member by forming an axial cup in the outer end thereof, forming an annular core member with an annular groove in the edge of its outer end, inserting the core member into the cup from the outer end, and folding the edge of the cup inwardly over the outer end of the core member and partially over the groove therein, forming

a cap with an annular flange at its inner side, inserting the inner end of the flange into the opening at the outer end of the knob member and into the inner radial portion of said groove, and then pressing said cap toward the knob member by applying a compression force between the outer side of the cap and the inner side of the enlarged outer portion of the knob member and thereby rolling the flange against the inner wall of the knob member at the portion surrounding the opening therein and thereby causing the cap to embrace the outer and inner sides of the knob member around said opening.

NELS H. SEAHOLM.

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The following references are of record in the file of this patent:

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2,326,646	Hillgren	Aug. 10, 1943

Aug. 8, 1950 N. H. SEAHOLM 2,517,803

DOORKNOB

Filed May 24, 1948

Fig. 1.

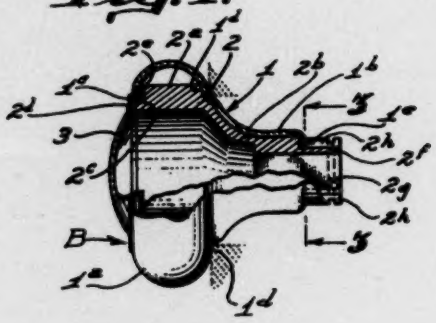


Fig. 2.

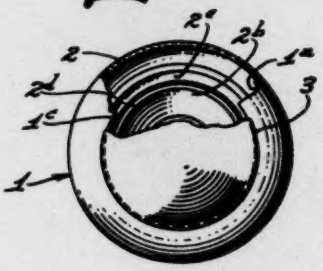


Fig. 4.

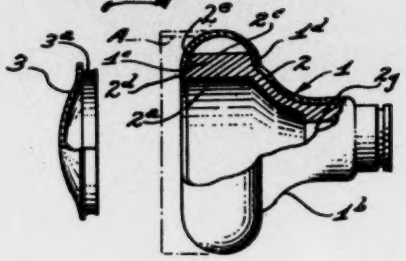
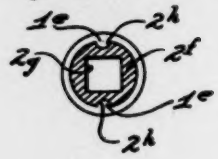


Fig. 3.



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